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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,987	12/31/2003	Neil J. Bershad	42P17667	9976
8791 7590 02/08/2008 BLAKELY SOKOLOFF TAYLOR & ZAFMAN 1279 OAKMEAD PARKWAY SUNNYVALE, CA 94085-4040				
			EXAMINER OVANDO, PABLO R	
			ART UNIT 2614	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/749,987

Applicant(s)

BERSHAD ET AL.

Examiner

Pablo R. Ovando

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-9 and 11-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-9 and 11-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. Amendment filed on 7, December 2007 has been entered. Claims 1, 7, 9, 14, 16, 22 and 26 have been amended. Claims 2 and 10 have been cancelled.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1, 5, 6-8, 9 and 13-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bershad et al, Patent Application Publication 2002/0093919 (hereinafter referenced as Bershad) in view of Amano et al, US Patent 4,951,269 (hereinafter referenced as Amano), in further view of Hosur et al, "Wavelet Transform Domain Adaptive FIR Filtering".

As to **claim 1**, Bershad discloses a method comprising: transforming a signal (Fig. 1 send input decoder 110); adapting a first adaptive filter (fig. 3 adaptive filter 310, it is also noted that based on the system model of an adaptive filter depicted in fig. 2, the plant **210** is capable of modeling the input signal and adapting the signal using the feedback illustrated in fig. 2) based on the transformed signal, estimating a delay of an impulse response based on the adaptation of the first filter (fig. 3 delay estimator 320, paragraph 37); delaying a signal based on the estimated delay (paragraph 58); and

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adapting a second adaptive filter in the time domain based on the delayed signal (note that Bershad teaches the time domain in fig. 3 adaptive filter 330, paragraph 38. note that Amano also teaches this feature in fig. 1, elements 12, 15 and 16).

Bershad does not explicitly teach transforming from a time domain to a transform domain with a wavelet transform and adapting the first adaptive filter in the transform domain. However, Amano teaches transforming a signal from a time domain to a FFT and sending the transformation to the FIR filter 12 (col. 7 lines 5-25), wherein an algorithm for the coefficients is used. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to apply the teachings of Amano in Bershad for the purpose of "reducing calculations" (abstract).

In the same field of endeavor, Hosur teaches using a wavelet transform to transform from a time domain to a transform domain (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to apply the teachings of Hosur in Bershad for the purpose of providing decomposition into subbands which gives a higher flexibility in terms of scalability. Additionally, the transform reduces computation and increases convergence.

As to **claim 5**, Bershad discloses that estimating the delay comprises identifying one or more adapted coefficients of the first adaptive filter having extreme values relative to the other coefficients of the filter. It is noted that paragraph 37 discloses that the delay estimator 320 determines the bulk delay in the echo channel 120 using the estimated channel weight vector  $W$  provided by the adaptive filter. Additionally, the autoregressive generator illustrated in fig. 4a 410 determines the vector  $W$  by completing

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several iterations and paragraph 66 discloses that the peak locator can determine the maximum value of the weights, which reads on "having extreme values relative to the other coefficients of the filter".

As to **claim 6**, Bershad discloses that the delay comprises identifying an adapted coefficient having the largest absolute value (paragraph 65 lines 5-8, paragraph 66 lines 1-6).

As to **claim 7**, Amano teaches estimating the delay comprises transforming the estimate of the delay from the transform domain to the time domain (Note that Bershad already computes the delay in the time domain. Additionally, fig. 1 elements 12-16 teach that the transform is performed)

As to **claim 8**, Bershad discloses reducing an echo based on the adaptation of the second adaptive filter (abstract lines 7-9, paragraph 38).

As to **claim 9**, Bershad discloses a storage medium having stored thereon data representing sequences of instructions that if executed cause an apparatus to function (paragraph 26 lines 1-8). Bershad also discloses the sequence of instructions that correspond to the method steps of claims 1 (see rejection of claim 1).

As to **claim 13**, Bershad discloses a storage medium having stored thereon data representing sequences of instructions that if executed cause an apparatus to perform steps (paragraph 26 lines 1-8). Bershad also discloses the sequence of instructions that correspond to the method steps of claims 6 (see rejection of claim 6).

As to **claim 14**, see similar rejection to claim 7.

As to **claim 15**, Bershad discloses a storage medium having stored thereon data representing sequences of instructions that if executed cause an apparatus to perform steps (paragraph 26 lines 1-8). Bershad also discloses the sequence of instructions that correspond to the method steps of claim 8 (see rejection of claim 8).

4. **Claims 16, 20-22, 23- 25, 26, 28 and 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bershad et al, Patent Application Publication 2002/0093919 (hereinafter referenced as Bershad) in view of Amano

As to **claim 16**, Bershad discloses an apparatus comprising: a signal transformer (fig.1 send input decoder 110) to transform a signal to a transformed signal; a first adaptive filter (fig. 3 adaptive filter 310) in communication with the signal transformer (fig. 3 adaptive filter 310), the first adaptive filter to adapt based on the transformed signal, a delay estimator (fig. 3 delay estimator 320) in communication with the first adaptive filter, the delay estimator to estimate a delay associated with an impulse response based on the adaptation of the first adaptive filter (paragraph 37); a delayer in communication with the delay estimator (fig. 4b input separator 450), the delayer to delay a signal in the time domain based on the estimate of the delay (paragraph 58); and a second adaptive filter in communication with the delayer (fig. 3 adaptive filter 330), the second adaptive filter to adapt in the time domain based on the delayed signal (paragraph 38).

Bershad does not explicitly teach transforming from a time domain to a transform domain and adapting the first adaptive filter in the transform domain. However, Amano teaches transforming a signal from a time domain to a FFT and sending the transformation to the FIR filter 12 (col. 7 lines 5-25), wherein an algorithm for the coefficients is used. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to apply the teachings of Amano in Bershad for the purpose of "reducing calculations" (abstract).

As to **claim 20**, Bershad discloses that the delay comprises identifying an adapted coefficient having the largest absolute value (paragraph 65 lines 5-8, paragraph 66 lines 1-6).

As to **claim 21**, Bershad meets all the limitations with the exception of explicitly disclosing to have a delayer selected from a group consisting of a buffer and a delay line. Examiner takes Official Notice that several delay elements existed at the time of the invention, such as buffers, delay lines, etc. Therefore, it would have been obvious to select a buffer or a delay line as a delayer for the purpose of delaying the signal.

As to **claim 22**, Bershad discloses that number of coefficients of the second adaptive filter is based on a longest expected impulse response for the channel. Paragraph 38 and 66 disclose that the weight vectors calculated by the adaptive filter 330 correspond to the impulses provided by the delay estimator. Additionally, the peak locator 510, which is in the delay estimator 320, determines the peaks as being the

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maximum values of the weights wherein "longest" reads on maximum and "impulse" reads on weight.

As to **claim 23**, Bershad discloses that the delayer comprises a delayer to delay the input signal so that the second adaptive filter is substantially centered about the estimate of the delay. Paragraph 57-58 discloses that the adaptive filter 330 contains an input separator 450 that delays the signal of the input. Also, the second adaptive filter would be shorter than the first adaptive filter and inherently it would be centered about the estimate of the delay.

As to **claims 24 and 29**, Bershad meets all the limitations with the exception of explicitly disclosing that that the network device is implemented with a switch fabric. Paragraph 26 discloses that the information is implemented and forwarded to other devices using network transmission, thus making the device a network device. Additionally, it was well known in the art at the time of the invention to use switch fabric in any switch network as admitted by Applicant. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the prior art of using a switch fabric for the purpose of efficiency and to be compatible with other technologies that the network device would need to interact with.

As to **claim 25**, Bershad discloses implementing the apparatus in a network device including a DRAM memory (paragraph 26 lines 22-25, where in "DRAM" reads on flash). It is noted that applicant discloses that flash is a type of memory that can be employed and would function in the same manner as a DRAM memory.



As to **claim 26**, Bershad discloses the method of the apparatus in claim 26 (see rejection of claim 16). Additionally, Bershad discloses a flash memory, which is equivalent to a DRAM memory (paragraph 26 lines 22-25).

As to **claim 28**, Bershad discloses that estimating the delay comprises identifying one or more adapted coefficients of the first adaptive filter having extreme values relative to the other coefficients of the filter. It is noted that paragraph 37 discloses that the delay estimator 320 determines the bulk delay in the echo channel 120 using the estimated channel weight vector W provided by the adaptive filter. Additionally, the autoregressive generator illustrated in fig. 4a 410 determines the vector W by completing several iterations and paragraph 66 discloses that the peak locator can determine the maximum value of the weights, which reads on "having extreme values relative to the other coefficients of the filter".

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. **Claims 3-4, 11-12**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Bershad in view of Amano and Hosur, as applied above, and in further view of K. C. Ho and S. D. Blunt, "Rapid Identification of a Sparse Impulse Response Using an Adaptive Algorithm in the Haar Domain" IEEE Trans. on Signal Processing, Vol. 51, No. 3, pp. 628-638, March 2003 (hereinafter referenced as Ho et al).

As to **claims 3-4** Bershad, as applied to claims 1 and 9, meets all the limitation with the exception of disclosing that transforming the signal comprises transforming the signal with a partial Haar transform (page 628). However, Ho et al teaches these algorithms. Therefore, It would have been obvious for one having ordinary skill in the art at the time of the invention was made to transform the signals using a partial Haar or wavelet transform for the purpose of reducing the number of coefficients required by the adaptive filter and to "...reduce computation and speed up convergence".

As to **claims 11-12**, Bershad discloses the sequence of instructions (paragraph 26 lines 2-5) of claims 11-12 that correspond to the method steps of claims 3-4 respectively (see rejections of claims 3-4).

7. **Claims 17-19 and 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bershad in view of Amano, as applied to claims 16 and 26, and in further view of K. C. Ho and S. D. Blunt, "Rapid Identification of a Sparse Impulse Response Using an Adaptive Algorithm in the Haar Domain" IEEE Trans. on Signal Processing, Vol. 51, No. 3, pp. 628-638, March 2003 (hereinafter referenced as Ho et al).

As to **claims 17-19**, Bershad meets all the limitation with the exception of disclosing that transforming the signal comprises transforming the signal with a wavelet transform and a partial Haar transform (page 628). However, Ho et al teaches these algorithms. Therefore, It would have been obvious for one having ordinary skill in the art at the time of the invention was made to transform the signals using a partial Haar or wavelet transform for the purpose of reducing the number of coefficients required by the adaptive filter and to "...reduce computation and speed up convergence".

As to **claim 27**, Bershad discloses the method of the apparatus of claim 27 (see similar rejections to claims 17-19).

### ***Response to Arguments***

8. Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo R. Ovando whose telephone number is 571-272-9752. The examiner can normally be reached on M-F 7:30 am to 5:00pm, EST, Alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ahmad Matar can be reached on 571-272-7488. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

P.O.

  
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